AMENDMENTS TO THE CLAIMS

The listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1. (Currently Amended) A synchronization establishing method of a mobile station in a mobile communication system, in which a synchronization channel is periodically sent in a downlink signal so that the mobile station, which detects the downlink signal sent from a base station, can establish synchronization to the downlink signal, said synchronization establishing method comprising:

an averaging step of averaging first correlation values in phase in complex number within an averaging window over a plurality of periods of the synchronization channel, and of outputting first averaged correlation values;

a powerizing step of powerizing the first averaged correlation values individually, and of outputting first powerized correlation values;

a step of averaging the first powerized correlation values, and of outputting first power averaged correlation values; and

a peak detecting step of detecting a peak of the first powerized correlation values output.

Claims 2 and 3. (Cancelled).

Claim 4. (Currently Amended) The synchronization establishing method as claimed in claim 1 [[2]], wherein a number of periods of the first correlation values, over which the averaging is carried out in the averaging window, is equal to a moving unit of the averaging window.

Claim 5. (Currently Amended) The synchronization establishing method as claimed in claim 1 [[2]], wherein the step of averaging first correlation values [[step]] assigns weights at every period of the first correlation values in the averaging window.

Claim 6. (Currently Amended) The synchronization establishing method as claimed in claim 2 [[1]], wherein the step of averaging first correlation values [[step]] carries out averaging using an exponential weighting averaging method.

Claim 7. (Currently Amended) The synchronization establishing method as claimed in claim 2 [[1]], wherein the step of averaging first correlation values [[step]] makes phase correction of one of the first correlation values by using the first correlation values in a period previous to the period of the one of the first correlation values.

Claim 8. (Currently Amended) The synchronization establishing method as claimed in claim 7, wherein the step of averaging first correlation values [[step]] assigns weights to every period of the first correlation values to which the phase correction is applied.

Claim 9. (Original) The synchronization establishing method as claimed in claim 7, wherein the powerizing step outputs real parts of the first correlation values to which the phase correction is applied.

Claim 10. (Currently Amended) [[The]] A synchronization establishing method ~~as claimed in claim 1~~ of a mobile station in a mobile communication system, in which a synchronization channel is periodically sent in a downlink signal so that the mobile station, which detects the downlink signal sent from a base station, can establish synchronization to the downlink signal, said synchronization establishing method comprising:

an averaging step of averaging first correlation values in phase in complex number over a plurality of periods of the synchronization channel, and of outputting first averaged correlation values;

a powerizing step of powerizing the first averaged correlation values individually, and of outputting first powerized correlation values; and

a peak detecting step of detecting a peak of the first powerized correlation values output, wherein when the synchronization channel is estimated to be transmitted alternately from two antennas, the averaging step averages second correlation values that are estimated to be transmitted from a same antenna, and outputs second averaged correlation values; and the powerizing step detects power of the second averaged correlation values to output second powerized correlation values.

Claim 11. (Original) The synchronization establishing method as claimed in claim 10, wherein the averaging step averages the first correlation values and the second

correlation values separately, and the powerizing step detects power of the first averaged correlation values and power of the second averaged correlation values, and selects one of two sets of the first powerized correlation values and the second powerized correlation values.

Claim 12. (Original) The synchronization establishing method as claimed in claim 10, wherein the averaging step averages the first correlation values and the second correlation values separately, and the powerizing step detects power of the first averaged correlation values and power of the second averaged correlation values, and assigns weights to the first powerized correlation values and the second powerized correlation values at individual timings, followed by summing them up, respectively.

Claim 13. (Original) The synchronization establishing method as claimed in claim 11, wherein the powerizing step assigns weights to a maximum value of the first powerized correlation values and to a maximum of the second powerized correlation values, and selects the powerized correlation values that will give a greater maximum value.

Claim 14. (Original) The synchronization establishing method as claimed in claim 11, wherein the powerizing step selects one of two sets of the first powerized correlation values and the second powerized correlation values such that the selected one differs from the powerized correlation values selected previously.

Claim 15. (Original) The synchronization establishing method as claimed in claim 14, wherein the powerizing step makes a decision as to which one of two sets of the first

powerized correlation values and the second powerized correlation values is to be selected in accordance with a number of times the two sets of the powerized correlation values are selected.

Claim 16. (Original) The synchronization establishing method as claimed in claim 14, wherein the powerizing step successively selects one of two sets of the first powerized correlation values and the second powerized correlation values by a predetermined number of times, and when synchronization is not established, it selects the other set of the powerized correlation values.

Claim 17. (Original) The synchronization establishing method as claimed in claim 10, further comprising a step of selecting the correlation values to be averaged, wherein the averaging step averages one of two sets of the first correlation values and the second correlation values selected.

Claim 18. (Original) The synchronization establishing method as claimed in claim 17, wherein the step of selecting calculates correlation between correlation values in a given period to be averaged and correlation values in a period adjacent to the given period.

Claim 19. (Original) The synchronization establishing method as claimed in claim 17, wherein the step of selecting selects the correlation values to be averaged in response to a control signal transmitted from the base station.

Claim 20. (Original) The synchronization establishing method as claimed in claim 17, wherein the averaging step carries out the averaging over a plurality of first averaging periods that are different from each other, and the powerizing step assigns weights to the plurality of powerized correlation values at individual timings, followed by summing them up.

Claim 21. (Currently Amended) The synchronization establishing method as claimed in claim 1, wherein the step of averaging first correlation values [[step]] carries out the averaging over a plurality of first averaging periods that are different from each other, and the powerizing step selects a maximum value from the plurality of powerized correlation values.

Claim 22. (Currently Amended) The synchronization establishing method as claimed in claim 1, wherein the step of averaging first correlation values [[step]] carries out the averaging over a second averaging period that adaptively varies.

Claim 23. (Currently Amended) [[The]] A synchronization establishing method ~~as claimed in claim 22,~~ of a mobile station in a mobile communication system, in which a synchronization channel is periodically sent in a downlink signal so that the mobile station, which detects the downlink signal sent from a base station, can establish synchronization to the downlink signal, said synchronization establishing method comprising:

an averaging step of averaging first correlation values in phase in complex number over a plurality of periods of the synchronization channel, and of outputting first averaged correlation values;

a powerizing step of powerizing the first averaged correlation values individually, and of outputting a first powerized correlation values; and

a peak detecting step of detecting a peak of the first powerized correlation values output, wherein the averaging step carries out the averaging over an ~~second~~ averaging period that adaptively varies, and wherein the averaging period is varied in response to a moving speed of the mobile station.

Claim 24. (Currently Amended) [[The]] A synchronization establishing method ~~as claimed in claim 1~~ of a mobile station in a mobile communication system, in which a synchronization channel is periodically sent in a downlink signal so that the mobile station, which detects the downlink signal sent from a base station, can establish synchronization to the downlink signal, said synchronization establishing method comprising:

an averaging step of averaging first correlation values in phase in complex number over a plurality of periods of the synchronization channel, and of outputting first averaged correlation values;

a powerizing step of powerizing the first averaged correlation values individually, and of outputting first powerized correlation values; and

a peak detecting step of detecting a peak of the first powerized correlation values output, wherein the averaging step carries out the averaging over an ~~a third~~ averaging period that is varied depending on a state of the mobile station, which includes a power up state, an idle state and a traffic state of the mobile station.

Claim 25. (Currently Amended) [[The]] A synchronization establishing method ~~as claimed in claim 1 further comprising a step~~ of a mobile station in a mobile communication system, in which a synchronization channel is periodically sent in a downlink signal so that the mobile station, which detects the downlink signal sent from a base station, can establish synchronization to the downlink signal, said synchronization establishing method comprising:

an averaging step of averaging first correlation values in phase in complex number over a plurality of periods of the synchronization channel, and of outputting first averaged correlation values;

a powerizing step of powerizing the first averaged correlation values individually, and of outputting first powerized correlation values;

a peak detecting step of detecting a peak of the first powerized correlation values output; and

outputting, when the mobile station is at power up, ~~second~~ power averaged correlation values by detecting powers of the correlation values of the synchronization channel first, and by averaging the powers thereafter, wherein the peak detecting step detects a peak of the ~~second~~ power averaged correlation values.

Claim 26. (Currently Amended) The synchronization establishing method as claimed in claim 25, wherein the averaging step carries out the averaging over an ~~a fourth~~ averaging period that varies depending on the idle state and the traffic state of the mobile station.

Claim 27. (Currently Amended) [[The]] A synchronization establishing method ~~as claimed in claim 1 further comprising a step~~ of a mobile station in a mobile communication

system, in which a synchronization channel is periodically sent in a downlink signal so that the mobile station, which detects the downlink signal sent from a base station, can establish synchronization to the downlink signal, said synchronization establishing method comprising:

an averaging step of averaging first correlation values in phase in complex number over a plurality of periods of the synchronization channel, and of outputting first averaged correlation values;

a powerizing step of powerizing the first averaged correlation values individually, and of outputting first powerized correlation values;

a peak detecting step of detecting a peak of the first powerized correlation values output; and

outputting, when the mobile station is in one of the power up and idle state, [[third]] power averaged correlation values by detecting powers of the correlation values of the synchronization channel first, and by averaging the powers thereafter, wherein the peak detecting step detects a peak of the [[third]] power averaged correlation values.